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ABSTRACT

The University of Akron has been using computer assisted instruction (CAI) with cable television (CATV) in a system that blends man and machine delivery systems for instruction of its students. The system provides supplemental instruction in a variety of courses, but present hardware does not allow complete fulfillment of the instructional design. Further technological developments are needed to fill the gaps. (Author/WH)

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The Computer and the Camera.

CAI and CATV - The Missing Link?

by

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INTRODUCTION

At the University of Akron Computer Assisted Instruction has been serving as a supplementary classroom tool to our CATV system, since the fall quarter of 1972. The major objective of this activity has been to help teachers teach more effectively by enabling many students and a single teacher to engage in a one-to-one dialog, by using a high speed digital computer as the communications medium. What in effect transpires is a highly individualized form of instruction that is made possible by the interactive and record keeping capabilities of the computer system. As a result, the teacher is able to monitor and tailor instruction to fit a student's needs without physically sitting at the student's elbow.

HOW MANY ARE SERVED?

Because of this fortunate set of circumstances we are able to provide supplemental instruction across a wide variety of courses. To date we have served over:

1. 700 students in Basic English Grammer
2. 400 students in Basic Mathematics Skills
3. 900 students in Introductory Chemistry
4. 600 students in Tests and Measurements
5. 300 students in Research Techniques
6. 450 students in Introductory Statistics
7. 100 students in Introduction to COBOL

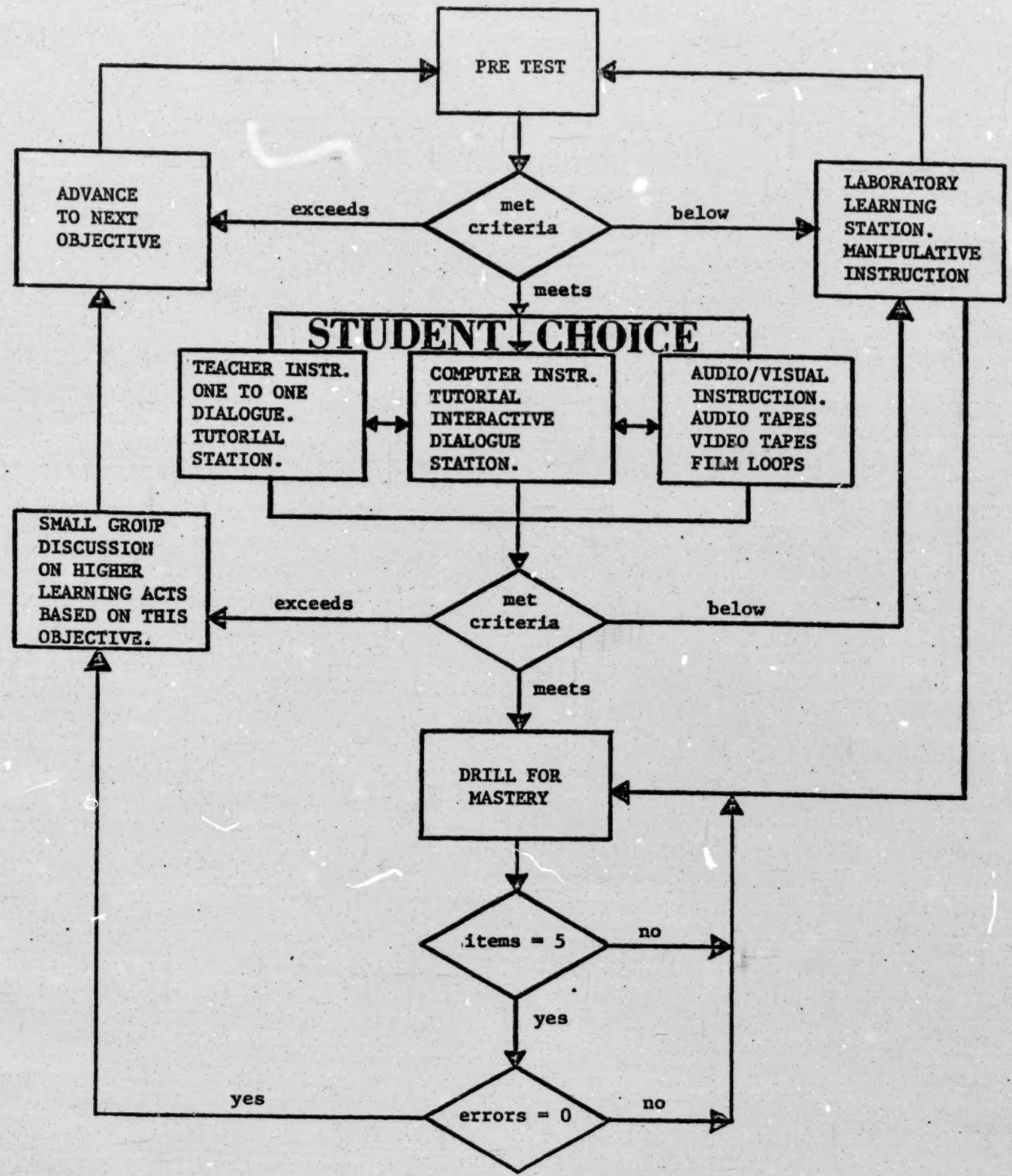
8. 200 students in Mathematics Education
9. 1000 students in various games and other mind extenders
10. 150 students in steel design modules
11. 200 students in Reading

A POSSIBILITY AND A PROBLEM

Although this type of capability is a substantial benefit to both the students and faculty, the methods of delivery and coordination between it and our CATV system are, to this date, rather primitive and in many ways lack the precise synchronization of technology that most certainly will come about within the next decade. In order to clarify this statement the following overview of the individualized instructional delivery system that is in effect at the University of Akron is presented.

INSTRUCTIONAL DESIGN FOR A LEARNING RESOURCE CENTER

As part of the learning activities taking place in several of the University's survey type courses in its learning resource center, the following instructional design has been implemented. Assume that its purpose is to furnish an instructional system which has a high probability of providing a multimedia delivery system that will assist students in the achieving of a set of well defined instructional objectives.


PRE TEST
ADVANCE TO NEXT OBJECTIVE
exceeds
met criteria
below
LABORATORY LEARNING STATION. MANIPULATIVE INSTRUCTION
meets
STUDENT CHOICE
TEACHER INSTR. ONE TO ONE DIALOGUE. TUTORIAL STATION.
COMPUTER INSTR. TUTORIAL INTERACTIVE DIALOGUE STATION.
AUDIO/VISUAL INSTRUCTION. AUDIO TAPES VIDEO TAPES FILM LOOPS
SMALL GROUP DISCUSSION ON HIGHER LEARNING ACTS BASED ON THIS OBJECTIVE.
exceeds
met criteria
below
meets
DRILL FOR MASTERY
items = 5
no
yes
yes
errors = 0
no

HOW IT'S DONE

Notice that this instructional model requires that the instructional program supply the resources needed for assessing student entry level into a given objective. Such pretesting enables the system to provide a vehicle for assisting students in choosing the type of teaching mode they prefer on a given topic. In order to funnel the selections to an appropriate set of choices, student performance is compared to well defined criteria. If the student matches the criteria he is offered a choice of instructional mode, if his performance is less than the pre set criteria he is directed to a laboratory type of instruction, if he exceeds the criteria he is moved to the next objective. It is through such tactics that instruction is delivered in a style that meets the student's level of development. The necessary data supply for this decision making is collected by means of on-line testing.

Up to this stage our present computer software, hardware and communications gear is well suited to the task of supproting the instructional logic. However, it is at the moment of methods selection, that the hardware fails to live up to the demands of the instructional design.

A MAJOR PROBLEM

At present time the student who chooses any form of in-

struction other than computer instruction is forced to leave the interactive system to which he has been attached. For example: if the learner decides to make use of the audio visual instruction provided by CATV, film loops, or audio tapes he must leave the computer terminal instruction station and manually initiate instruction through his chosen media. The major problems connected with such an interruption are:

1. failure to electronically keep track of the student's use of the other media and his position in its program.
2. a lack of interactive capabilities in the other media.
3. the sometimes unavoidable scheduling interruptions that occur due to the limits of available materials on a one-to-one basis. i.e., the tape or film loop is being used by someone else or all other CATV terminals are in use.
4. the change in media necessitated by post assessment, under several of the offline instructional options.

If the CATV, the audio tapes, and the other media were deliverable under computer control, at the same instructional station then by the above deficiencies could be overcome in both the Laboratory Learning Stations and the A/V Instructional Stations.

A POSSIBLE SOLUTION

Within the next decade the video disk could solve this problem. However, before it can be of any benefit, such a disk must be both technologically and economically practical. Until such a dynamic and versatile CAI-CATV system can be provided, both CAI and CATV will continue to fall short of the

full promise they held forth only one short decade ago. The video disk is an idea whose time has come. However it is an idea that has been thwarted by a lack of a visible demand for such a device. It is time for those who concern themselves with the development of CAI-CATV systems to make known to the vendors their need for this missing technological link. They can not be expected to provide the optimal system of instruction so long as they do not have hardware and software that are designed for such a task. At present time, the computer industry gives a casual nod to education. What is needed is a thorough examination of the educator's needs and a new approach to developing computer terminals and storage devices that will have the roots of their development in the fundamental principles of learning theory. At present time I see no such development that is presently marketable.

FILLING THE GAP

Because of the previously listed shortcomings, today's CAI-CATV systems are forced to utilize the most versatile and patient learning system that has yet been developed - the human teacher. As part of the instructional selection mode of our current system the student may select a human tutor for direct one-to-one learning. Many studies by modern day learning theorists support the soundness of providing such opportunities. In fact the entire instructional paridigm of our CAI system is based on the

tenants of educational psychology, and what they suggest to us about readiness and the need for a variety of instructional opportunities to exist for student choice. However when the student chooses to utilize the human tutor option, the problems generated by a change in media come into play. They are:

1. getting information to the tutor on each student's position in the learning sequence. i.e., objective mastered or not mastered.

2. the change in media necessitated by post assessment. i.e., the student is at the end of the tutoring session routed to the terminal for post assessment and finds that all terminals are occupied. He then must wait until a terminal is available. This can be and is a frustrating situation for the student.

The question is how do we provide a variety of instructional choices and at the same time not give up the data collecting capabilities that are provided as part of the CAI-CATV system? And too, how do we maintain a constant response system in such a situation? However sound our design may be we are left with the thorny problem of finding a method for systematically storing data on student performance when he is not under the watchful eye of the computer.

One of the ways that the University of Akron's paridigm attempts to overcome such shortcomings in computer-human learning relationships is through the use of small group learning sessions. These sessions are used as a culminating learning experience for all of the CAI-CATV instructional programs. However they are difficult to schedule, and lack

some of the spontaneity that could be provided if the CAI-CATV system had its own interactive capabilities. Currently our small group interactive sessions are scheduled by the computer on the basis of individual student performance and metered out by the computer into small clusters of students who are ready for a group session. However such sessions are available to the student only after he has mastered the current objective as each learning system revolves around one well defined objective. He is then ready to use the skills associated with it to explore higher learning activities through this group interaction. If the student has not mastered the objective but has a rudimentary understanding of the skills involved, he is directed to a drill and practice session. These drill and practice sessions make up a significant part of our computer assisted instruction system. Such sessions are provided in order to assure the mental cementing of needed basic skills for those who fail to master an objective in the instructional activities that they have experienced thus far. In this way the marginal learning that has taken place is fixed and developed for future use and exploitation in the small group discussion sessions.

SUMMARY

The fundamental purpose of this entire presentation is to point to the achievements and problems that have been

experienced by one university in its attempt to provide a CAI-CATV system that attempts to blend man-machine delivery systems for instruction of its students. There are obvious gaps in the present system.

Hopefully the computer systems of today are near closing the ring on such a complete instructional system. However, the gap that remains between it, CATV, and man is a significant one. Until it is closed the development of CAI-CATV programs will continue to be a slow, tedious and troublesome task. Let us hope that the steps to closing the ring being taken by the TICCIT project are successful. If they are not we may not see the development of the true two-way CAI-CATV system until well into the twenty-first century--twenty-five years from today.